DOCUMENT RESUME

ED 184 865 SE 030 518

AUTHOR Nous, Albert P.; Biglan, Barbara
TITLE Urban Environmental Education Project, Curriculum Module VII: Urban Ecology - Our Future Together.
INSTITUTION Allegheny Intermediate Unit, Pittsburgh, Pa.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
PUB DATE Aug 79
NOTE 43p.; For related documents, see SE 030 511-519.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Class Activities; *Decision Making; *Ecology; Environment; *Environmental Education; *Environmental Influences; Natural Resources; Pollution; *Science Education; Secondary Education; Urban Education; *Urban Environment

ABSTRACT

Included in this module are four activities dealing with ecology and applications of ecological principles in the urban environment. Activities included are: (1) the study of ecology; (2) study of consequences of activities within an ecosystem; (3) environmental impacts--benefits and detriments; and (4) choices for the future. Also included are an overview, teacher background information, an activity preview, and a pretest. A module evaluation form and a script for a slide series on Allegheny County, Pennsylvania are also included. (RE)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED184865

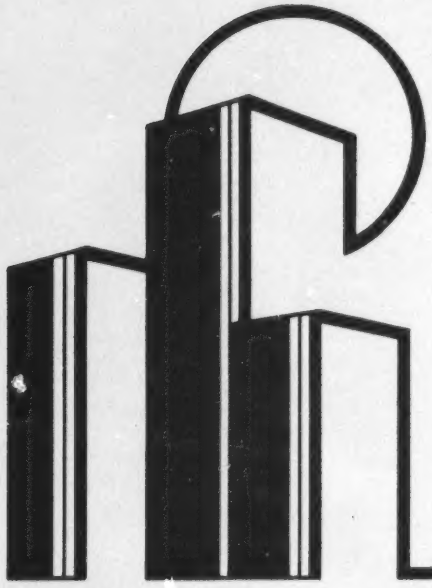
U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Harold E. Oyer

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."



Curriculum Module VII

Urban Environmental Education Project

Urban Ecology: Our Future Together

developed by Albert P. Nous and Barbara Biglan

SE 030 518

ALLEGHENY INTERMEDIATE UNIT

Instructional Support Services
Suite 1300, Two Allegheny Center
Pittsburgh, PA 15212

Dr. Harold E. Oyer, Executive Director
Dr. Therese T. Walter, Assistant Executive Director
Dr. Daniel R. Nicholes, Director of Citizenship Education

The activity which is the subject of this document was supported in whole or in part by the United States Office of Education, Department of Health, Education and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S.O.E. and no official endorsement by the U.S.O.E. should be inferred.

URBAN ENVIRONMENTAL EDUCATION PROJECT

Curriculum Module VII

Urban Ecology: Our Future Together

developed by

Albert P. Nous and Barbara Biglan

August 1979

Catherine Cornbleth, Curriculum Series Editor
University of Pittsburgh

Urban Ecology: Our Future Together

TABLE OF CONTENTS

OVERVIEW	1
TEACHER BACKGROUND INFORMATION	3
ACTIVITY PREVIEW	8
PRETEST	-
ACTIVITY 1. SO WHAT'S ECOLOGY?	9
Classroom Environment	SM 1.1
ACTIVITY 2. BEFORE IT'S TOO LATE	13
Before It's Too Late	SM 2.1
Project Map	SM 2.2
Proposed Environmental Action Checklist	SM 2.3-5
ACTIVITY 3. ENVIRONMENTAL IMPACT: BENEFITS & DISADVANTAGES	18
Environmental Impact: Benefits & Disadvantages	SM 3.1
ACTIVITY 4. FUTURE CHOICE	20
Decision-Making Map	-
MODULE EVALUATION	-
SLIDE SERIES: Air Pollution and Progress in Allegheny County	-

Urban Ecology: Our Future Together

OVERVIEW

Any action, from the most simple to the most complex, involves both costs and benefits. In the past, the costs and benefits of construction projects were considered primarily in terms of engineering and economics. In recent years, however, we have come to recognize that the environmental effects of any project also are important considerations. In addition to the usual engineering and cost analyses, we now expect a detailed account of actual and possible effects of construction projects on the environment -- air, water, energy resources, community vitality.

How will we benefit from the project?

What effects will the project have on our environment?

To what extent do the benefits outweigh the costs?

Putting together the answers to such questions, we have an environmental impact statement. All of us have the right and the responsibility to get involved and to voice our reactions and viewpoints. All too often, people think that they must have special status or expertise to get involved in developing environmental impact statements. While that may have been the case in the past, it does not appear to be the trend for the future. More and more citizens are serving on environmental advisory councils and planning committees.

The Environmental Policy Act of 1969 directed all agencies of the Federal Government to:

> ... identify and develop methods and procedures which will insure that presently unquantified environmental amenities and values are given appropriate consideration in decision-making along with economic and technical considerations.

The Council on Environmental Quality, to carry this idea further, has set forth guidelines for the preparation of required environmental impact statements. The language of the act is complicated and certainly does not read like a novel. These complex guidelines have been translated into a simpler yet comprehensive procedure for evaluating environmental impact. That procedure serves as a basis for the instructional activities in this module in which students analyze proposed actions and their probable impacts. A major goal of this module is to assist students in comprehending the interdependence that is ecology and in examining and evaluating the environmental impact of alternative actions related to urban construction and project planning.

Urban Ecology: Our Future Together

TEACHER BACKGROUND INFORMATION

The study of the environment can be overwhelming. Likewise, ecology is a vast and encyclopedic subject that examines the interaction of living things with each other and their environment. The world's environments "house" more than two million different kinds of animals and plants. Adding the "built" or "man-made" to the "natural" environment further increases the complexity of the subject. Urban ecology has a somewhat sharper focus, emphasizing the interactions and relationships among human beings and their (natural and built) environment.

The many aspects of ecology and the environment can be organized with a relatively few concepts:

a. The term environment refers to a definable place where an organism lives and includes both biological and physical features of the place. (The word environment comes from the French verb environner, meaning to surround, and it includes all the conditions, circumstances, and influences surrounding and affecting an organism or group of organisms.)

b. A habitat is the natural abode or living space of an animal, plant, or person. (The word comes from the Latin, habitare, meaning to dwell; it, therefore, also includes all features of the environment in a given locality.) Frequently, the terms habitat and environment are used for physical features such as topography, water supplies, and climate but the terms are not confined to physical features, for plants and other animals also form major components of any given habitat or environment.

c. A population is a group of interacting individuals, usually of the same species, in a definable space.

d. A community, in the biological sense, consists of the populations of plants and animals living together in a given place.

e. An ecosystem is any spatial or organizational unit that includes living organisms and nonliving substances interacting to produce an exchange of materials between them. The term ecosystem is more inclusive than the terms population and community and is similar in scope to the concept of environment. An ecosystem includes populations, communities, habitats, and environments, and it specifically refers to the dynamic interaction of all parts of the environment, focusing particularly on the exchange of materials between the living and nonliving parts. Ecosystems consist of four basic components: abiotic substances, producer organisms, consumer organisms, and decomposer organisms.

f. Abiotic substances are nonliving substances. Water, oxygen, sodium chloride (salt), nitrogen, and carbon dioxide are considered abiotic when they are physically outside living organisms. Once within a living organism they become part of the biotic world. (In the word abiotic, the prefix "a" means without and the stem "biotic" means living.)

g. Producer organisms are bacteria and plants that synthesize organic compounds. They are said to be autotrophic or self productive in that they take inorganic compounds and manufacture organic materials and living protoplasm from them. All green plants, including microscopic algae, are producer organisms since they exhibit photosynthesis, and some bacteria are producers, since they may exhibit chemosynthesis or photosynthesis. All life depends on basic productive capacity of green plants and bacteria.

h. Consumer organisms are animals who utilize organic materials directly or indirectly manufactured by plants. Consumers are unable to produce their own organic compounds for basic nutritive purposes. They are called heterotrophic, which means "relying on different or varied sources of nutrition." Primary consumers may be omnivores (plant- and animal-eaters) or carnivores (animal-eaters).

i. Decomposer organisms are bacteria and fungi that degrade organic compounds. In essence, they are the digestive organisms of an ecosystem. These reduce the complex organic molecules of dead plants and animals to simpler organic compounds that can be absorbed by green plants as vital nutrients. Decomposers provide the final, essential link in the cycle of life. If decomposers were not active, organic compounds would become locked into molecules that could not be utilized as nutrients by plants.

Cities: Incomplete Ecosystems

While most ecosystems contain producers, primary and secondary consumers, and decomposers, there are ecosystems lacking one or more of these basic components. The central core of the city is without "producers," and is considered an incomplete ecosystem. Some green plants exist, but they do not supply sufficient quantities of food for the humans and animals living within the inner city (rats, pigeons, starlings, sparrows, cats, dogs, etc.). For these inhabitants, the inner city requires outside production and imported food. The only other alternative is for the inhabitants to leave the inner city and "feed" in outlying areas. This occurs with starlings and pigeons, creating an ecological situation analogous to bats leaving their caves at night, seeking food, and returning in the early morning. The lack of production in an inner

city is not due to a lack of light but to a lack of soil and suitable substrata.

In other ways, cities may be considered incomplete ecosystems, "ecologically parasitic" upon the surrounding landscape. Cities import food, fresh air, and water; at the same time they export waste products such as sewage, solid wastes, carbon dioxide, sulfur dioxide, and other pollutants. If cities were cut off from their surrounding environment, the inhabitants would die of thirst, starvation, asphyxiation, or the toxic accumulation of waste products. However, in exchange for their life support, cities provide many cultural and economic benefits such as employment, housing, transporation, manufacturing, health care, education, and businesses. The relationship between the city environment and the rural or landscape environment is vital to both, but it is important to remember that, as cities expand, they require more outside support to sustain themselves.

Ecological systems are characteristically dynamic and complex, usually involving interactions among many variables and often displaying delayed or cumulative effects. (The effects of nuclear "accidents" are but one example.) Urban areas are among the most complex ecosystems. Thus, environmental impact considerations are of particular importance to our urban future and the quality of our lives.

A Study in Environmental Impact

Developing an impact statement regarding the effect of a proposed construction project on the environment is similar to the decision-making process illustrated in the environmental decision map. Developing an environmental impact statement involves:

1. Outlining the objectives of the project;
2. Determining the technological possibility of achieving the objectives;
3. Proposing one or more action plans for achieving each objective, including anticipated benefits and costs;
4. Describing the characteristics and conditions of the existing environment prior to the project action or actions;
5. Identifying the degree, extensiveness, or scale of the environmental impact for each action plan (from step 3), i.e., judging the environmental impact of each plan;
6. Offering a summary and recommendations, including the relative merits of the various proposed action plans and the rationale behind the final choice of action.

For sources of further information about ecology and environmental impact and planning, see:

Environmental Learning: A Directory for Western Pennsylvania. (Leonard S. Mudge Environmental Education Program, Carnegie Museum of Natural History, 4400 Forbes Avenue, Pittsburgh, PA 15213), 1979.

This directory lists organizations and programs offering speakers and field experiences as well as print and audio-visual materials.

ACTIVITY PREVIEW

This module contains four activities, each of which requires approximately one class period, except for Activity 2, which will likely involve two class periods. Supplementary experiences also are provided, which would increase the time needed.

Activity 1. So What's Ecology?

Using urban examples, students develop working definitions of ecology and ecological relationships and then identify additional examples of interdependence within the urban environment.

Activity 2. Before It's Too Late

With a brief description and map of an actual construction project plan as a case study, students identify possible environmental effects of the proposed project.

Activity 3. Environmental Impact: Benefits & Disadvantages

Students summarize and evaluate their findings regarding the likely environmental impact of a proposed Senior Citizen High-Rise Complex.

Activity 4. Future Choice

Students review and synthesize data about urban ecology and the proposed Senior Citizen High-Rise Complex as a basis for decision-making.

NOTE: A knowledge pretest for students, reprinted on the following pages, is provided in the Student Materials Packet.

Urban Ecology: Our Future Together

MODULE VII PRETEST

1. Which of the following is a part of the environment?

   a. natural features
   b. people
   c. buildings
   d. all of the above

2. Which of the following words best describes "ecology"?

   a. environment
   b. interdependence
   c. conservation
   d. energy

3. Study of the relationships of living things to each other and to their natural and built environment is a definition of

   a. ecology.
   b. ecosystem.
   c. environment.
   d. energy.

4. Environment refers to

   a. a time period.
   b. urban areas.
   c. our surroundings.
   d. pollution sources.

5. An environmental impact statement describes how

   a. the environment influences city planning.
   b. a project proposal might change the environment.
   c. environmental quality can be improved.
   d. people live.

6. In an ecosystem,

   a. one change is likely to lead to another.
   b. no changes are possible.
   c. a small change probably will not make much difference.
   d. none of the above.

7. In an ecosystem,

   a. there are only living things.
   b. there are only nonliving things.
   c. living and nonliving things interact with and influence each other.
   d. only a few living things can survive.

8. Cities are

   a. complete, independent ecosystems.
   b. incomplete ecosystems.
   c. simple ecosystems.
   d. not ecosystems.

9. In which of the following areas is environmental change <u>least</u> likely to result from an urban construction project?

   a. landscape
   b. transportation patterns
   c. waste disposal and treatment
   d. wildlife

10. Most urban construction projects

   a. are beneficial to the environment.
   b. damage the environment.
   c. have advantages and disadvantages.
   d. do not affect the environment.

ACTIVITY 1. So What's Ecology?

Objectives: In this activity, students define ecology and provide examples of how (1) people interact with and change their environment, and (2) a change in one aspect of the urban environment results in changes in other aspects of the environment.

Organizing Ideas: A change in one aspect of the environment (natural, built, human) affects other aspects of the environment.

1. Ecology (urban ecology)
2. Interdependence
3. Change

Student Materials:

Handout (provided in the Student Materials Packet)

Classroom Environment (SM 1.1)

Suggested Procedures:

1. Introduce the concept of ecology, using the following or similar definitions and examples. Either begin with a definition and then ask students to explain how the examples fit the definition; or, begin with the examples and then provide (or ask students to infer) a definition. If necessary, clarify or ask students to explain the distinctions among natural, built, and human environments.

   a. Ecology = (the study of) relationships among living and nonliving things; relationships of living things to each other and to their environment. More specifically, urban ecology = (the study of) the relationships among city dwellers (as individuals or as a group) and the natural, built, and human environment of the city.

"Relationship" means that something affects or influences something else. Often the relationship is mutual, that is, two or more things affect each other. For example, there is a relationship between the construction of interstate highways and the growth of suburbs. The highways made travel easier, which encouraged the growth of suburbs. Also, the growth of suburbs increased the demand for more and better highways. These relationships are one aspect of urban ecology.

The "environment" is our surroundings -- natural, human, and built. The natural environment includes plants, animals, and physical phenomena such as rivers, mountains, and islands. The human environment, which is part of the natural environment, refers to people. The built environment includes those things that people have made such as homes, factories, roads, bridges, and monuments.

b. Example -- City Growth, Decline, and Revival: Large numbers of people moved to cities to find work in factories. As industries expanded, so did other businesses, and cities grew in size (both population and area). As cities grew, they became crowded, and open spaces disappeared. Many people who could afford to move out did so, and suburbs appeared. The people who stayed in the inner city often were poor; the taxes they paid were not enough to support adequate city services, and the quality of city life began to decline. As more people moved to suburbs, so did some industries and businesses. With more people commuting longer distances between home and work (and shopping and recreation areas), traffic congestion, energy use, and air pollution are increasing. Now, many older cities are trying to revive their downtown areas and neighborhoods to encourage residents to stay and others to move back to the city.

c. Note that each sentence in the simplified description of city growth, decline, and revival indicates an ecological relationship. In addition to or instead of this verbal description, photos might be used to illustrate aspects of urban ecology and ecological relationships. For example:
   - young people hiking along a park nature trail
   - workers changing shifts at a factory
   - housing construction
   - crowds in a department store or apartment complex
   - young people playing basketball on a city lot
   - rats eating uncollected garbage in an alley
   - traffic congestion
   - air pollution near a factory or highway
   - modern downtown buildings or plazas
   - people at a community art festival
   - people going to a theatre or concert
   - people feeding squirrels in a park

2. Ask students to provide additional examples of how one change produces or results in other changes in urban ecology. If students have difficulty generating examples, ask "What would happen if . . ."

   a. U. S. Steel went out of business?
   b. we used up all the world's oil?
   c. 100,000 people moved into the Pittsburgh area in 1980?
   d. water pollution controls were removed, and industries could dump their wastes in the rivers?
   e. air pollution destroyed most of the wildlife (flowers, birds, etc.)?

3. To simplify the concept of ecology, begin with more familiar, closer-to-home illustrations before introducing those in 1 and 2 above. For example, ask students to describe their environment at home, in the classroom, or in the neighborhood. Encourage students to include (and later to distinguish) the human, natural, and built aspects of the environment they describe.

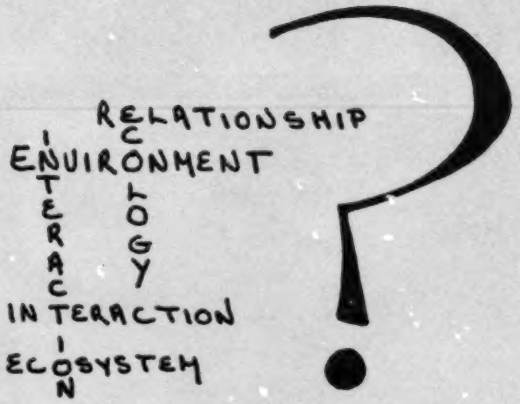
   a. In addition to an oral or written description of a familiar environment, students might prepare a drawing of the environment. SM 1.1 provides a sample format. Then, ask students to add arrows (or other symbols) to indicate interactions between elements in the environment (and to describe these interactions). For example, in the classroom environment, students read and complete worksheets and then the teacher reviews and returns them. Or, classwork stops while the principal makes an announcement over the speaker system.

   b. Similar to 3a. above, students might diagram the likely effects of a change in the environment. For example, what might happen if 10 or more students were added to the class?

4. At this point, students should begin to recognize that complexity and interdependence are characteristic of urban environments. The complexity and interdependence increase the difficulties involved in dealing with environmental problems and making sound decisions. This idea might be presented as a conclusion to the activity, or you might ask students, "What can we conclude about urban environments and ecology?" and encourage

several student responses and reasons for each (e.g., "What else can we conclude?" "Why do you say that?")

5. An optional follow-up activity might involve students in tracing (perhaps in a diagram) the changes resulting from or associated with a recent event affecting their community. For example, what have been the effects of the building of a new shopping center, the closing of a major street or bridge for repairs, higher gasoline prices or short supplies? The resulting diagram would reinforce the idea of the interdependent "web" that is urban ecology.



CLASSROOM ENVIRONMENT

This classroom is a simple ecosystem. To help understand the meaning of this word and others such as environment, ecology, interaction, relationship, and interdependence, we will begin by describing the classroom environment.

First, draw a map or picture of this classroom. Include all the things and people usually found in this classroom.

Now, use symbols to label each part of the classroom environment as human, natural, or built. Indicate your symbols here.

= human
= natural
= built

ACTIVITY 2. Before It's Too Late

Objectives: Given a proposed urban redevelopment plan, students identify associated environmental changes such as those involving land transformations and construction, resource extraction, resource renewal, waste disposal and treatment, transportation and communication.

Organizing Ideas: Construction projects change the environment.

1. The changes may be beneficial, detrimental, or both, depending upon one's point of view.
2. Environmental changes might involve or be related to:
   a. landscape (including construction)
   b. resource use (extraction, renewal)
   c. waste (production, disposal, treatment)
   d. transportation (nature, volume, patterns)
   e. pollution (air, water)

Student Materials:

Handouts (provided in the Student Materials Packet)

Before It's Too Late (SM 2.1)

Project Map (SM 2.2)

Proposed Environmental Action Checklist (SM 2.3, 2.4, 2.5)

Suggested Procedures:

1. This activity involves students in examining and evaluating a proposed change in the urban environment. The project plan for a Senior Citizen High-Rise apartment complex is intended to be used as a case study. The complex is to be built near the business district of a medium-sized,

middle-class suburb of a large city. The description of the project in SM 2.1 provides information about location, land conditions, and environmental considerations as well as time and costs. Additional information requested by students should be inferred or stipulated (by the students and/or teacher).

Note: If desired, a local proposal of interest to students might be substituted for this case study (e.g., plans for a recreation center or a new school building).

2. Read, or ask students to read the proposed project plan (SM 2.1) aloud. Explain or clarify any of the terms or any parts of the zoning map (SM 2.2) that might be confusing. An Information Supplement to the zoning map is provided for teacher use. Some or all of this information might be shared with students.

3. After reviewing the plan and map, ask students to complete the proposed environmental action checklist (SM 2.3-2.5) by putting a check in the space preceding each item that applies to the project plan. Encourage students to add other items as appropriate.

   a. Land transformation deals with construction that changes the landscape.

   b. Resource extraction and processing includes removal of materials from the land and their refinement for use (e.g., mining, lumbering).

   c. Resource renewal refers to improvement of the landscape (or returning it to its original condition).

   d. Waste disposal and treatment includes methods of waste collection and processing.

   e. Changes in transportation and communication include those associated with or resulting from the project.

   f. Other environmental changes include major changes in natural, built, or human environments.

4. In small groups, or as a class, students might compare their responses, citing reasons or evidence to support their conclusions. Disagreements should be resolved with reference to the plan, map, and "common sense" (and other resources that might be available). Also, note that some possible results or consequences of a project cannot be predicted with certainty.

5. To simplify the environmental analysis introduced in this activity:

   a. Shorten the proposed environmental action checklist by deleting items that do not apply and are unfamiliar to students, and/or;

   b. Begin by using the proposed environmental action checklist with one of the changes previously considered (from Activity 1) before moving to the project plan provided here.

Before It's Too Late

Welcome to "Your Town." As part of an urban redevelopment program, a senior citizen high-rise complex has been proposed. You are a member of the town environmental advisory council. Your group has been asked to evaluate the proposed project in terms of the possible environmental effects.

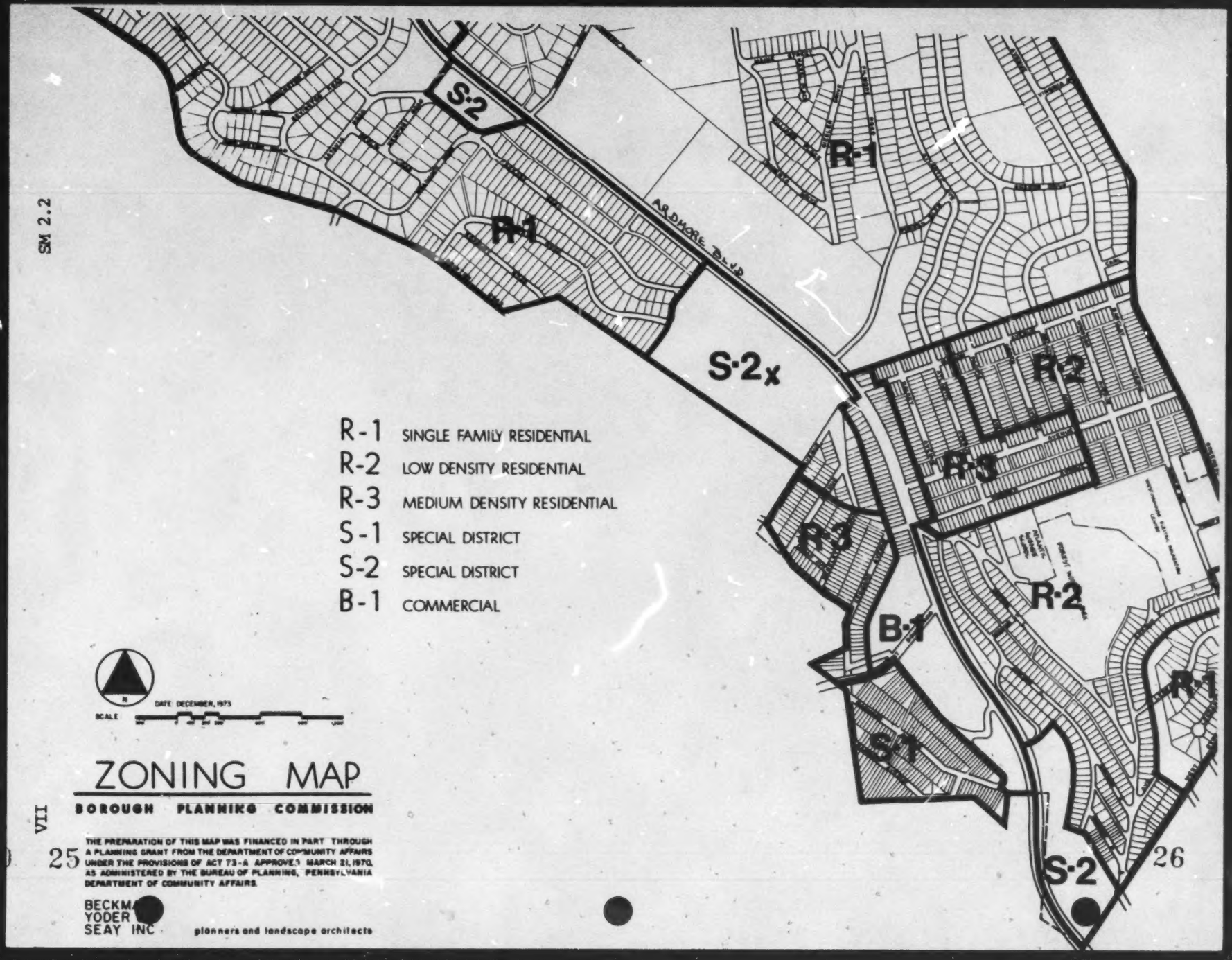
First, read the project proposal carefully, and refer to the map that is provided.

PROPOSED PROJECT: A SENIOR CITIZEN HIGH-RISE COMPLEX

"Your Town" officials have a Master Plan for the redevelopment of the local business district. Over the past 15 years, many small businesses have moved out, and new shopping centers have been built near the older, original business district. The population of Your Town has grown too. Now, there also is a need for more parking spaces throughout the business district.

Your Town officials have decided to acquire the old properties and clear them so that a developer can come in and begin to rebuild the area. The entire project will take 2 to 3 years to complete. First, the old buildings must be taken down. Some of these buildings are gas stations; that means the underground gasoline storage tanks must be dug up. One building is an auto repair shop where the surrounding soil is saturated with old oil and rusted auto parts. There is also a creek running near the property to be developed. The creek must be covered or made to flow through concrete pipes.

This development site is considered very good for the senior citizens because it is on a bus route and near stores. The cost to tear down present buildings and prepare the land is estimated to be $750,000. The cost to build the entire development, including the 100-unit senior citizen apartments, is estimated to be $500,000. The zoning map that follows shows some geographic features of the area and present business locations as well as the proposed development site.



ZONING MAP

BOROUGH PLANNING COMMISSION

THE PREPARATION OF THIS MAP WAS FINANCED IN PART THROUGH A PLANNING GRANT FROM THE DEPARTMENT OF COMMUNITY AFFAIRS UNDER THE PROVISIONS OF ACT 73-A APPROVED MARCH 21, 1970, AS ADMINISTERED BY THE BUREAU OF PLANNING, PENNSYLVANIA DEPARTMENT OF COMMUNITY AFFAIRS.

BECKMAN YODER SEAY INC
planners and landscape architects

SM 2.2

VII

25

26

Information Supplement to the Zoning Map

1. The topography is characterized by steep hillsides north and south of Ardmore Blvd. A creek runs south of Ardmore Blvd. through the R-1 and S-2x sections. Ardmore Blvd. is also the main road in the area, with a bus route (northwest) into the City.
2. The redevelopment plans call for changing the old business district, S-2x, by replacing many of the old buildings with apartments (including a senior citizen high-rise), parking facilities, and new commercial structures.
3. Current structures in the proposed redevelopment area are (from west to east):

   a. North of Ardmore Blvd. (beginning at Braddock Rd.)

      park (extending east to Filmore Rd.)
      gas station
      fire hall
      borough building
      moving company
      Midas Muffler
      gas station (vacant)
      laundromat
      pharmacy (apartments above)
      electric repair shop (apartments above)
      hardware store (vacant - apartments above)
      variety story (apartments above)
      decorator shop
      dentist

real estate office

hairdresser (apartments above)

b. South of Ardmore Blvd. (beginning East of Braddock Rd.)

Parkway Center East (offices, bank, restaurant)

restaurant

auto body shop

car wash - gas station (burned down)

gas station

church and parking lot (vacant)

hairdresser

donut shop (vacant)

bowling alley

savings and loan

car dealership

shopping center (grocery, 5 and 10, bakery, dairy store, etc.)

Proposed Environmental Action Checklist

Check the environmental changes that are necessary to complete the project or would result from it. (If you are uncertain about a particular item, put a question mark in the space provided.)

A. Land Transformations and Construction

___ 1. industrial sites, buildings

___ 2. highways, streets

___ 3. bridges

___ 4. power transmission lines, pipelines (gas, water)

___ 5. barriers, including fencing and retaining walls

___ 6. dams

___ 7. _____

___ 8. _____

B. Resource Extraction

___ 1. blasting, drilling

___ 2. mining

___ 3. energy generation

___ 4. well drilling

___ 5. _____

___ 6. _____

C. Resource Renewal

___ 1. reforestation

___ 2. wildlife stocking

C. Resource Renewal - continued

___ 3. water treatment

___ 4. waste recycling

___ 5. _____

___ 6. _____

D. Waste Disposal and Treatment

___ 1. dumping

___ 2. landfill

___ 3. incineration

___ 4. solid waste recycling

___ 5. energy recovery

___ 6. municipal and industrial sewage treatment

___ 7. _____

___ 8. _____

E. Transportation and Communication

___ 1. automobile, truck, bus

___ 2. railway

___ 3. shipping

___ 4. aircraft

___ 5. telephone

___ 6. television cable

___ 7. _____

___ 8. _____

F. Other Environmental Changes

___ 1. air quality

___ 2. water quality

___ 3. wildlife (plants or animals)

___ 4. ground cover (plants, paving)

___ 5. noise, vibration

___ 6. historic sites

___ 7. congestion (people, traffic)

___ 8. aesthetics (visual attractiveness)

___ 9. _____

___10. _____

ACTIVITY 3. Environmental Impact: Benefits & Disadvantages

Objectives: Referring to their Proposed Environmental Action Checklists, students summarize the environmental impact of the project, identify benefits and disadvantages, and consider how disadvantages might be minimized.

Organizing Ideas: A change in one aspect of the environment (natural, built, or human) affects other aspects of the environment.

1. Cost and benefits
2. Compromise (trade-offs)

Student Materials:

Handouts (provided in the Student Materials Packet)

Environmental Impact: Benefits & Disadvantages (SM 3.1)

Suggested Procedures:

1. Having completed the Proposed Environmental Action Checklist, SM 2.3-5, and shared their responses, students should be able to summarize the environmental impact of the project as a basis for establishing priorities and making decisions. This might be done in several ways:
   a. The class might be divided into six groups, corresponding to the six sections of the Checklist, with each group summarizing the likely environmental impact of the project in its area of concern.
   b. Working individually or in small groups, students might summarize the likely environmental impact of the project across the six areas.
2. Ask individuals or groups to present their summary reports. Then ask students whether the effects they have identified are benefits or disadvantages. Additional considerations include:
   a. Benefits (or disadvantages) for whom?
   b. How likely (e.g., possible, probable) are the effects?

c. How might disadvantages be overcome?

d. What other factors should be considered?

3. Students might organize their findings and opinions in a chart such as that provided in SM 3.1.

4. Optional supplementary experiences include:

a. During or after students' presentation of findings and discussion, ask students to distinguish between factual and normative (opinion, value) statements. (Factual statements can be verified, with reference to evidence. Normative statements can be justified but not verified.)

b. Ask students to rate each environmental effect and to explain the reasons for their ratings. For example:

0 = not very important
1 = somewhat important
2 = very important

SM 3.1

Environmental Impact: Benefits & Disadvantages

Effect	Rating	Comments

VII

ACTIVITY 4. Future Choice

Objectives: After reviewing information about urban ecology (from Activity 1) and their findings regarding the likely environmental impact of the proposed Senior Citizen High-Rise Complex (from Activities 2 and 3), students use the environmental decision-making model as a guide in deciding whether to approve construction of the project as originally planned or to recommend another plan. (To complete the decision-making map, students identify the issue and goal, consider at least one alternative to the original project proposal, identify the likely consequences of each option, and reach a tentative decision.)

Note: This activity, which is similar to Activity 5, "Community Futures," in Module IV, extends consideration of environmental factors in community decision-making. If students have previously completed "Community Futures," it would be worthwhile to review that experience as an introduction to this one or to compare the students responses in the two situations after completion of this activity.

Organizing Ideas: Sound decisions involve consideration of alternative proposals in terms of the available evidence and one's values.

1. All community project proposals have advantages and disadvantages.
2. There are no ideal routes to the future; when environmental, economic, and other factors are considered, trade-offs and compromise are necessary.

Student Materials:

Handouts (provided in the Student Materials Packet)

Decision-Making Map

Environmental Impact: Benefits & Disadvantages (from Activity 3)

Transparency (provided in the Student Materials Packet)

Decision-Making Map (same as handout)

Suggested Procedures:

1. Since a major purpose of this module is to encourage and assist students to make reasoned decisions about crucial urban environment-quality of life issues, it is desirable to review the students' experiences and findings from previous activities, to explain the decision-making process and map, to communicate the (personal and social) importance of informed citizens making responsible choices.

   a. The decision-making map transparency might be used alone or in conjunction with the handout to explain the process. A large group format is recommended in order to encourage sharing of a range of viewpoints and information among members of the "environment advisory council."

   b. Review of previous activities might come after students identify the environmental issue(s) and their priority quality of life goal(s) and before they examine choices and consequences prior to reaching a decision.

   c. To assist students in identifying and clarifying the issue(s) and goal(s), questions such as the following might be raised:

      What have been the major questions that we have asked about the Senior Citizen High-Rise proposal? (Which problems seem most serious? Why?)

      What seems to be the major environmental problem or issue?

      What should be the goal? (How would you like things to turn out?)

2. Ask students to summarize the likely consequences of the Senior Citizen High-Rise proposal and suggest alternative plans, encourage them to question each other's arguments by pointing out omissions or inconsistencies and requesting evidence to support claims. As discussion proceeds, remind students to note the main points (of each plan and its likely consequences)

on their decision-making maps. To stimulate discussion and decision-making, questions such as the following might be raised:

a. What other plans might be preferable? (How can we change the proposal to make it better?)

b. What problems might there be if we did that? (landscape, resource use, wastes, traffic, pollution, economic)

c. In what ways would people's lives be different if that happened?

d. Who would benefit most from that? least?

e. How likely is that plan to meet our goal?

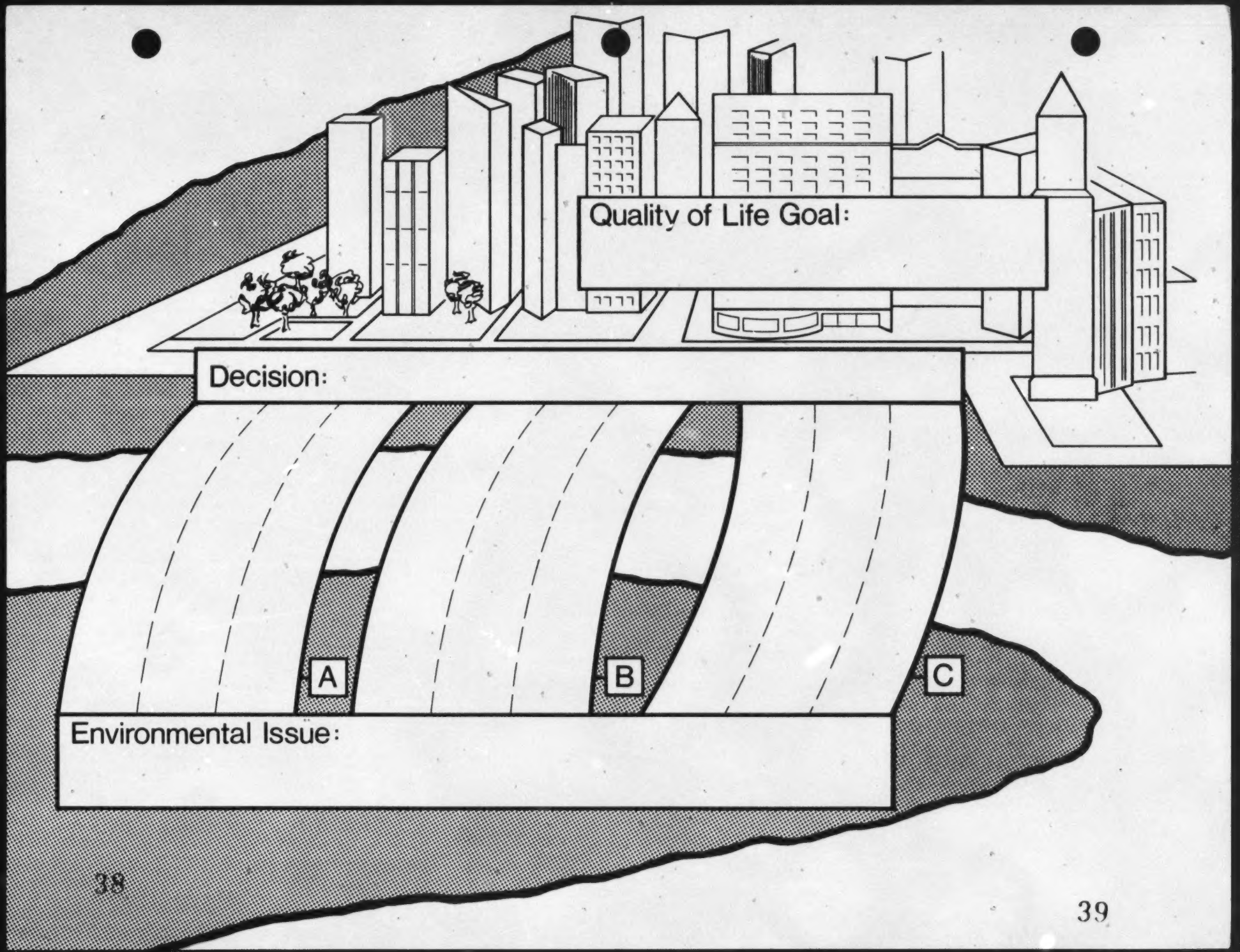
3. As a follow-up, each student might write a brief position paper, stating and explaining his/her decision.

4. Optional supplementary activities:

a. Return to the classroom environment descriptions from Activity 1, and consider possible changes in the classroom ecosystem that might improve that environment.

b. Examine one or more environmental issues concerning urban wildlife (plants, animals). For example, consider pest control (rats, insects), dog (and other housepet) ordinances, or nature preserves (development versus preservation).

c. Use the currently proposed Alaska Wilderness Bill as a case study illustrating conflict of interests regarding economic and resource development versus preservation of the natural environment.


Quality of Life Goal:
Decision:
A
B
C
Environmental Issue:

Urban Ecology: Our Future Together

MODULE EVALUATION

Please complete immediately after module use and return to C. Cornbleth, 4A01 Forbes Quadrangle, University of Pittsburgh, Pittsburgh, PA 15260.

Teacher _____ School _____

Address _____

Grade/Subject Area(s) _____ Date _____

A. Module Use Checklist

Please indicate whether you and/or your students used each section of this module by circling either YES or NO.

YES NO 1. Overview

YES NO 2. Teacher Background Information

YES NO 3. Activity Preview

YES NO 4. Pretest

YES NO 5. Activity 1. So What's Ecology?

(Activity 2. Before It's Too Late)

YES NO 6. Before It's Too Late

YES NO 7. Project Map

YES NO 8. Proposed Environmental Action Checklist

YES NO 9. Activity 3. Environmental Impact: Benefits & Disadvantages

YES NO 10. Activity 4. Future Choice

B. Initial Reactions

Please comment briefly on each of the following aspects of the module.

1. Importance of (knowledge, skills, and attitudinal) objectives:

2. Significance of content:

3. Appropriateness of activities (procedures, materials):

4. Useability, ease of teaching, practicality:

5. Student Reactions:

6. Your overall reaction to the module (check one):

___ Very Positive; ___ Positive; ___ Neutral or Uncertain;

___ Negative; ___ Very Negative

Thank you.

Slide Series: Air Pollution and Progress in Allegheny County

This series of 12 slides and accompanying script are intended to illustrate air pollution sources, consequences, and progress in the Pittsburgh area. The slides are particularly appropriate for use with Module V, Urban Air Quality: At What Costs? They also might be used with Module VII, Urban Ecology: Our Future Together, and Module VIII, Planning Your Urban Environment. The cooperation of the following agencies in providing slides for use here is acknowledged and appreciated:

Allegheny County Bureau of Air Pollution Control

Group Against Smog and Pollution (GASP)

Jones and Laughlin Steel

U. S. Steel

Slide 1. On a clear day in Pittsburgh, the sky, hills, river(s), buildings, and steel mills look picturesque. In the 1940's however, there were few clear days in Pittsburgh. It was known as the "Smoky City."

Slide 2. The photo on the right shows the smoke and air pollution from the steel mills in the 1940's. Today, with air pollution control devices, the same mill can look like the photo on the left. (What differences do you see?)

Slide 3. This close-up view of two smoke stacks shows former and present practices and resulting air quality. In the past, many tons of particulates (soot and ash) entered our air. Today, these emissions have been significantly reduced.

Slide 4. Pittsburgh is no longer the "Smoky City." But, a definite haze is still evident even on sunny days. In this view, looking east from downtown, the distant hills are barely visible.

Slide 5. Evening commuters, homeward bound on the Liberty Bridge, also can experience the pollution that develops in the downtown area. Downtown air quality is affected mainly by gasoline engine exhaust.

Slide 6. This photo shows steelmaking operations in the 1940's. Sometimes the red-orange smoke would light up the night sky in Pittsburgh.

Slide 7. Red-orange smoke is not completely a thing of the past. Today, some smoke is still emitted from steel mills in the Pittsburgh area.

Slide 8. Polluted air is pushed along by winds. Pollutants can end up miles from their source, damaging property, wildlife, and people.

Slide 9. Here, the area around the Clairton Coke works seems to be surrounded by fog. The pollution is so heavy that, when the winds are calm, the air around the plant becomes thick and parts of the buildings are hardly visible.

Slide 10. The air quality here seems to be extremely poor. The pollutants give the air a blue-gray hue. This photo was taken shortly before a rainstorm.

Slide 11. In the same area, after a rainstorm, the air quality seems to have improved. The haze is gone, and only lingering rain clouds are visible.

Slide 12. This map shows some of the major air quality monitoring stations in Allegheny County.

How likely is Pittsburgh to return to the "Smoky City" days? How much can we depend on wind and rain to lessen air pollution? How adequate are present air quality standards? What are the (economic and other) costs of clean air? These are just some of the questions that many people are asking now. The answers will affect our future.